Applicants note that Lowder discloses diamond brazes which chemically bond the diamond grains to the core of the tool. However, Lowder teaches nothing about the desirability of any particular tool geometry, nor about achieving a free-cutting abrasive cutting tool without loss of tool life due to premature loss of diamond grain.

Applicants' claims require a chemical bond between the abrasive grain and the substrate, **in combination with all other elements** of the claimed invention. The tool defined in claims 1 and 28 is much more than just a tool made with chemically bonded abrasive grain. The mechanical and geometric designs of the claimed tools as specified in claims 1 and 28 are neither disclosed nor suggested in the cited art.

A negative rake design is an optional element of Applicants' invention, recited only in claims 3-4, 10, 14-16, 28-29 and 34. Thus, Scott's disclosure of a negative rake angle in the cutting elements of the tool chain is not relevant to claim 1 and claims 5-9, 11-13, 17-26 and 30-33. Further, Applicants' tools may be operated in either rotational direction without loss of performance. This is not true of the cutting chains of Scott which are very likely to come unraveled if operated in a positive rake direction.

With respect to claim 28 and all other claims which include a negative rake angle limitation, Scott fails to suggest the desirability of a cutting tool having a tooth cutting structure extending from a monolithic substrate. Scott fails to suggest a cutting tool having Applicants' design, i.e., "each cutting level on each tooth being oriented such that a portion of each cutting level overlaps at least a portion of each other cutting level of the tooth." Scott discloses successive rows of grains, not successive rings of grain as recited in Applicants' claim 28. The row of abrasive grains in each mesh cutting element of Scott is not supported by monolithic metal, does not overlap the next row of grain, and is not supported-at least partially- by an additional row of abrasive grains.

The Scott design fails to provide steady state cutting conditions of the sort described in Applicants' text on page 11, lines 17-25, and Fig. 2. The Scott design cannot provide steady state

cutting conditions (consistant penetration rate and power consumption) because Scott does not have a "ring" of abrasive grain around the mesh cutting element. Therefore, during cutting, as the tool is worn and as the area of contact between the cutting element and the workpiece increases, there is no increase in the number of diamond grains in contact with the workpiece. In contrast, Applicants' tool design increases the number of grains in contact with the workpiece as the tool wears and the area of contact between the tooth and the workpiece increases to produce steady-state conditions.

Unlike Applicants' invention, wherein the abrasive grains surround and protect the teeth on the core to protect them from errosion during cutting operations (i.e., "undercutting" of the abrasive portion of the tool, causing premature loss of tool life), Scott's cutting elements are completely vulnerable to errosion and premature detachment of the cutting elements and of the abrasive grain and/or the mesh on which the grain is carried. Nothing in the construction or design of the Scott cutting elements will prevent cutting debris from entering underneath the mesh elements and damaging the mesh or its attachment points or the pivot mechanisms or the metallic attachment of the links to the remainder of the chain. Thus, while Scott's chains may be initially free-cutting, they do not have the necessary elements to insure long operational life and are very likely to experience chain and cutting element wear and loss before the diamond abrasive grain has been consumed.

For these reasons, Scott's design cannot yield the combined benefits of high cutting rate, high penetration rate, long steady state cutting conditions, and long tool life observed with the chemically bonded grain and monolithic core and tooth geometry designs specified for the tools of Applicants' invention.

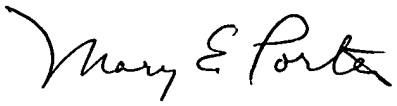
As for the circular saw suggested by Scott, the suggestion merely is to use an "inclined mesh cutting surface" on the saw. See col. 8, lines 16-18, of Scott. Applicants designs are not suggested.

For these reasons, Applicants' invention is not obvious over the contents of the cited patents.

CONCLUSION

In view of the remarks submitted herein, Applicants respectfully request reconsideration of the rejection and an allowance of the claims.

Respectfully submitted,



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